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Application No.: 10/604,692
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# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: WARREN, MATTHEW E

Group Art Unit: 2815

In re PATENT APPLICATION of
Applicants : LUNG ET AL.

Serial No. : 10/604,692

Filed : August 11, 2003

For : SPLIT-GATE NON-VOLATILE MEMORY

Attorney Docket: 10156-US-PA

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## ARGUMENTS IN SUPPORT OF PRE-APPEAL BRIEF REQUEST FOR REVIEW

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Dear Sir,

In connection with the Notice of Appeal to the Board of Patent Appeals and Interferences from the Non-Final Rejection dated June 3, 2008, and the Pre-Appeal Brief Request for Review concurrently filed herewith, Applicants hereby submit arguments in support of such Request.

**ARGUMENTS**

This application was subjected to a Final Rejection on January 14, 2008, wherein claims 1, 4-6, 8-10, 12 & 35-37 were rejected under 35 U.S.C. 102(e) as being anticipated by Haspeslagh (US 6,580,120) and claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Haspeslagh in view of Schwabe (US 4,257,832).

In response to the Final Rejection, Applicants filed on May 6, 2008 an RCE with preliminary amendments and the following remarks for explaining the novelty of claims 1, 4-6, 8-10, 12 & 35-37 and the non-obviousness of claim 11.

Features of amended claim 1/35 include: **1**) that *the split gate including the **at least two** neighboring conductive pieces shorted with each other* is a part of ***one*** word line of a non-volatile memory array including the non-volatile memory cell, and **2**) that ***only one*** coding region is defined in the memory cell by the ***at least two*** conductive pieces.

Haspeslagh fails to disclose the feature **1** or **2**. As shown in Fig. 5 and described in related paragraphs, ***one*** word line includes ***only one*** "conductive piece" 7/11, and the leftmost ***three*** "conductive pieces" 7/11 shorted with each other belong to ***three*** word lines $W_1$-$W_3$, rather then ***one*** word line. Moreover, as shown in Fig.3, each memory cell in Haspeslagh apparently has ***two*** coding regions defined by the ***only one*** conductive piece of the memory cell.

Another feature (**3**) of method claim 35 is that in the programming operation of the memory cell, ***0V*** is applied to the substrate and the ***source/drain*** while a first negative voltage is applied to the split gate, wherein the first negative voltage is

sufficiently high for injecting electrons into the coding region.

Haspeslagh also fails to disclose the feature **3** of claim 35. In the program operation of a memory cell in Haspeslagh, the ***source*** and the ***drain*** of the memory cell must be applied with ***different voltages*** to have two coding regions in one cell (Fig. 3).

It is also noted that Schwabe also fails to disclose or suggest the features **1-3**. For at least the above reasons, claims 1 & 35 and claims 4-6, 8-12 & 36-37 dependent therefrom all patently define over the prior art.

However, this application was rejected again in the Non-Final Rejection of 2008-06-03, wherein claims 1, 4-6, 8-10, 12 and 35-37 were still rejected under 35 U.S.C. 102(e) as being anticipated by Haspeslagh and claim 11 still rejected under 35 U.S.C. 103(a) as being unpatentable over Haspeslagh in view of Schwabe.

Against the above features **1-3** and Applicants' arguments, Examiner argued:

**a**). Haspeslagh discloses a split gate (7, 11) being part of one word line (W1 or W2) of a non-volatile memory array and discloses that only one coding region ($br_{j,i-1}$) is defined (only one bit in layer 16), by the two neighboring conductive pieces, in the charge trapping layer around the two opposite edge portions; and

**b**) with regards to remaining limitations of claim 35, and claims 36-37, the claimed "programming operation" is not considered to add any structure to the claimed ***device*** and is considered to be intended used of the device.

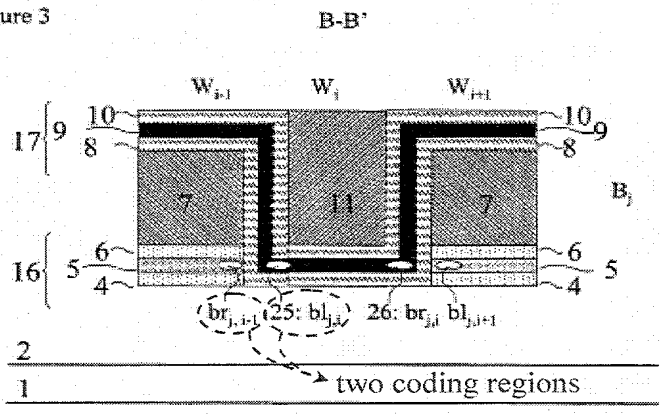
Applicants submit that the argument **a** is quite unreasonable for the reasons below.

First, the split gate that includes the two conductive pieces 7 and 11 corresponding to the two word lines W1 and W2 respectively must be a part of the ***combination*** of

W1 and W2, rather than a part of ***one*** word line W1 or W2. Specifically, since the conductive piece 7 is not a part of W2, W2 does not include the conductive piece 7 so that the split gate (7, 11) as the combination of the conductive pieces 7 and 11 is impossibly a part of W2; since the conductive piece 11 is not a part of W1, W1 does not include the conductive piece 11 so that the split gate (7, 11) is impossibly a part of W1 either. Analogously, a split gate (7, 11) including all the five conductive pieces 7 and all the four conductive pieces 11 in Figure 2h/5 of Haspeslagh is a part of the ***combination*** of the nine word lines W1-W9, rather than a part of ***any*** of W1-W9.

Second, according to Figure 3 of Haspeslagh provided and marked below, there are ***two*** coding regions $br_{j,i-1}$ and $br_{j,i}$, rather than ***only one*** coding region, defined by two neighboring conductive pieces 7 and 11 in the charge trapping layer (16, 17) around the two opposite edge portions of the two neighboring conductive pieces. Applicants submit that the charge trapping layer 17 must be considered together with the trapping layer 16 in comparing Haspeslagh to claim 1/35, for claim 1/35 limits that the split gate ***as a whole*** is located over the charge trapping layer (limitation **A**). When the layer 16 alone is taken as the charge trapping layer, the conductive piece 11 as a part of the split gate (7, 11) is not located over the charge trapping layer so that the limitation **A** of claim 1/35 cannot be met.

Figure 3




As for the argument 2, Examiner seemed to have mistaken method claims 35-37 for apparatus claims like claim 1. Specifically, what is claimed in claims 35-37 is not "*a **device***" (split-gate non-volatile memory cell) but is "***an operating method** of a split-gate non-volatile memory cell*", so that claims 35-37 are actually ***method claims*** rather than apparatus claims. Hence, the above "programming operation" in claim 35 not disclosed in Haspeslagh or Schwabe surely has its weight on the patentability of claims 35-37.

Accordingly, Applicants still submit that at least because Haspeslagh fails to disclose any of the above features **1-3** of claims 1 & 35, claims 1 & 35 and claims 4-6, 8-10, 12 & 35-37 dependent therefrom all have novelty, and claim 11 dependent from claim 1 is non-obvious since Schwabe also fails to disclose or suggest the above features **1-3**.

Respectfully submitted,

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